



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
CHEMICAL PLANT OPERATION N6

(8050026)

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This question paper consists of 5 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA
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CHEMICAL PLANT OPERATION N6
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
 2. Read all the questions carefully.
 3. Number the answers according to the numbering system used in this question paper.
 4. Use only a black or blue pen.
 5. Write neatly and legibly.
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QUESTION 1

Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.1–1.5) in the ANSWER BOOK.

- 1.1 The evaporation process is used for the dehydration of gases.
- 1.2 Hydrogen sulphide removed from the purification of natural gas contributes to air pollution. 闔
- 1.3 One of the advantages of a filled-system thermometer is that the maximum temperature is not limited.
- 1.4 Measurement of a Bourdon tube between 1–350 bars can be done by using an Alby steel tube.
- 1.5 A resistance thermometer can be used to measure small temperature areas. (5 × 1) [5]

QUESTION 2

Choose an item from COLUMN B that matches a description in COLUMN A by writing only the letter (A–H) next to the question number (2.1–2.5) in the ANSWER BOOK.

COLUMN A		COLUMN B	
2.1	Indicating element 闔	A	crystallisation
2.2	Sensory element	B	condensation
2.3	n-Paraffin series	C	secondary element
2.4	Used to separate high boilers from gases	D	evaporation
2.5	The process of adding latent heat to liquid to form a vapour	E	primary measuring element
		F	C_nH_{2n+2}
		G	absorption 闔
		H	C_nH_{2n}

(5 × 1)

[5]

QUESTION 3

- 3.1 Define the following:
- 3.1.1 Distillation
- 3.1.2 Volatility 閩 (2 × 2) (4)
- 3.2 Differentiate between *Raoult's law* and *Dalton's law*. (4)
- 3.3 Write brief notes on the following:
- 3.3.1 Tray spacing (4)
- 3.3.2 Counterflow trays (3)
- 3.4 State FIVE factors affecting the rate of ion exchange. (5)
- [20]**

QUESTION 4

- 4.1 Differentiate between *polymerisation* and *alkylation*. 閩 (4)
- 4.2 Describe in sequence the operation of by-product coke oven procedures. (10)
- 4.3 Raw natural gas contains undesirable water and hydrogen sulphide which must be removed before it can be moved to transmission lines.
- 4.3.1 Name FOUR methods that can be used in the dehydration of gas. (4)
- 4.3.2 State TWO problems that could be caused by hydrogen sulphide in the gas. (2)
- [20]**

QUESTION 5

- 5.1 Define the term *liquid petroleum gas* (LPG). (2)
- 5.2 State FOUR uses of liquid petroleum gas (LPG). (4)
- 5.3 Define the following: 閩
- 5.3.1 Aromatisation (2)
- 5.3.2 Octane number (3)
- 5.3.3 Hydrogenation (2)
- 5.3.4 Naphtha (2)

- 5.4 What is the difference between *intermediate base crudes* and *naphthene base crudes*? (5)
[20]

QUESTION 6 闖

- 6.1 6.1.1 Make a neat drawing of a McLeod gauge. (6)
- 6.1.2 Describe the operation of the McLeod gauge of which you made a drawing in QUESTION 6.1.1. (8)
- 6.2 Name SIX stages in sequence in the production of caustic soda. (6)
[20]

QUESTION 7

- 7.1 Write brief, clarifying notes on the hydrogen electrode for the measurement of pH. (6)
- 7.2 Define the *Celsius scale*. 闖 (2)
- 7.3 How does Hagen-Poiseuille's law describe viscosity? (2)
[10]
- TOTAL: 100**